Ramadan and Medications

Prepared by :

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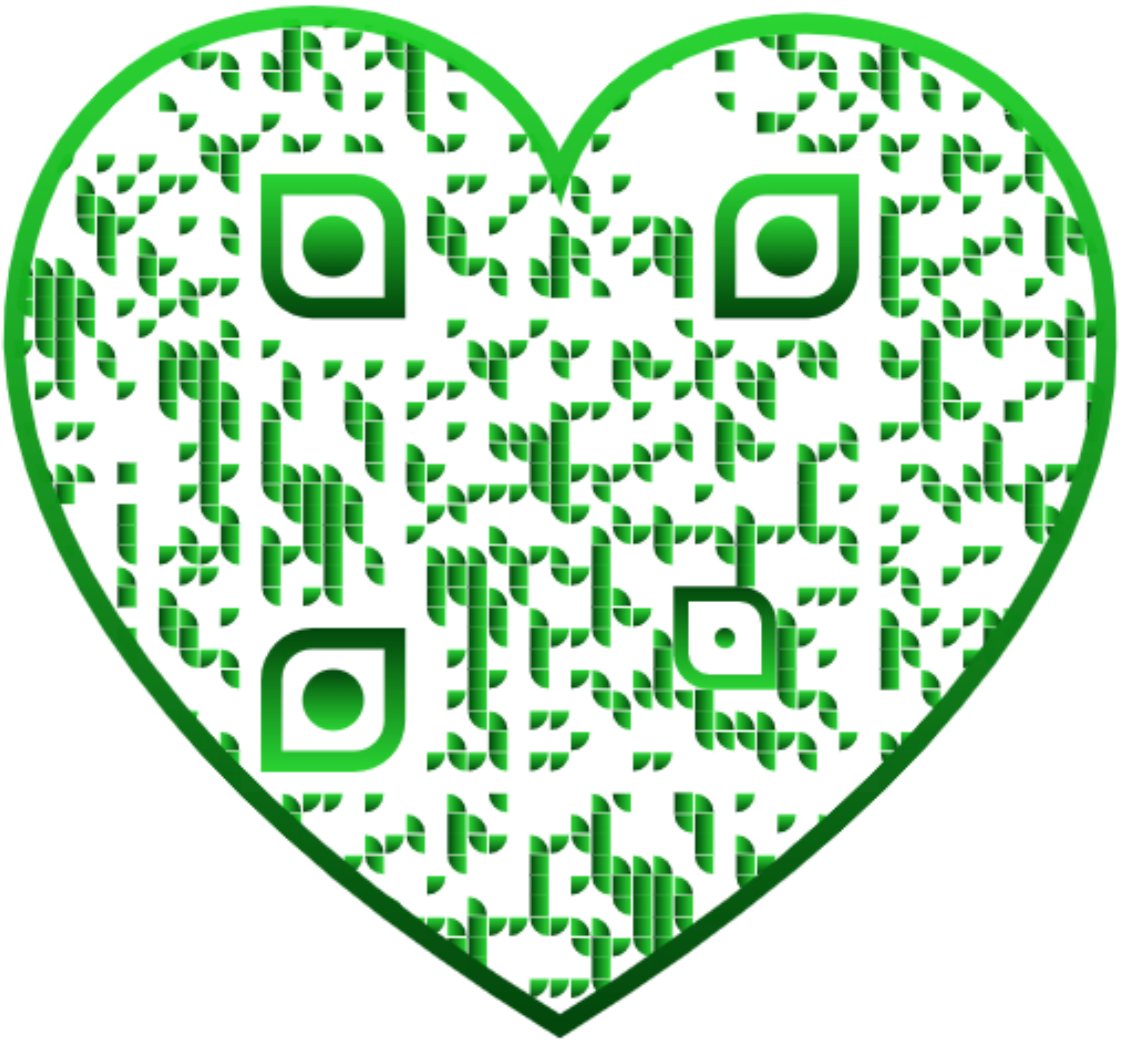

Ramadan and Medications

Objectives:

1. Effect of fasting on the Pharmacokinetics of drugs
2. To know which route of administration that could BREAK the fast
3. To know how medications could be managed in Ramadan
4. To know how to optimize diabetic medications in Ramadan
5. Effectively managing Antibiotics use during Ramadan

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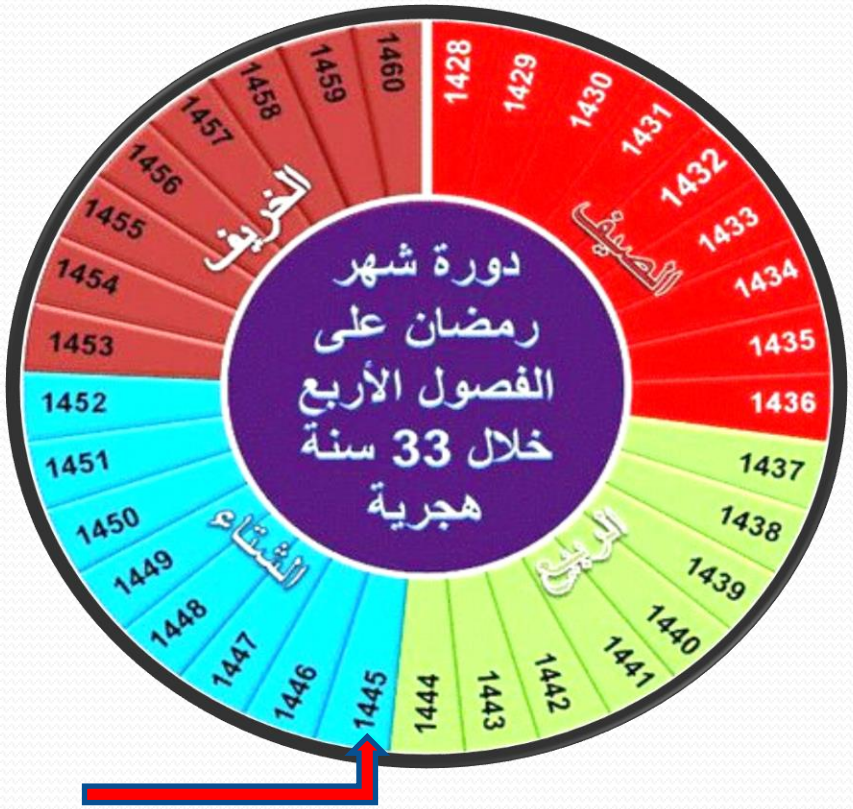
Some facts about Ramadan:

1) Ramadan is the ninth month of the Islamic lunar calendar
2) The hours spent fasting vary accordingly from 11-18 hours a day
3) Adult Muslims are required to fast
4) Adult Muslims are must abstain from food, water and desires.
5) Rhythms of life and habits are changed during Ramadan .

Some facts about Ramadan:

- **Ramadan can occur in any of the four seasons**



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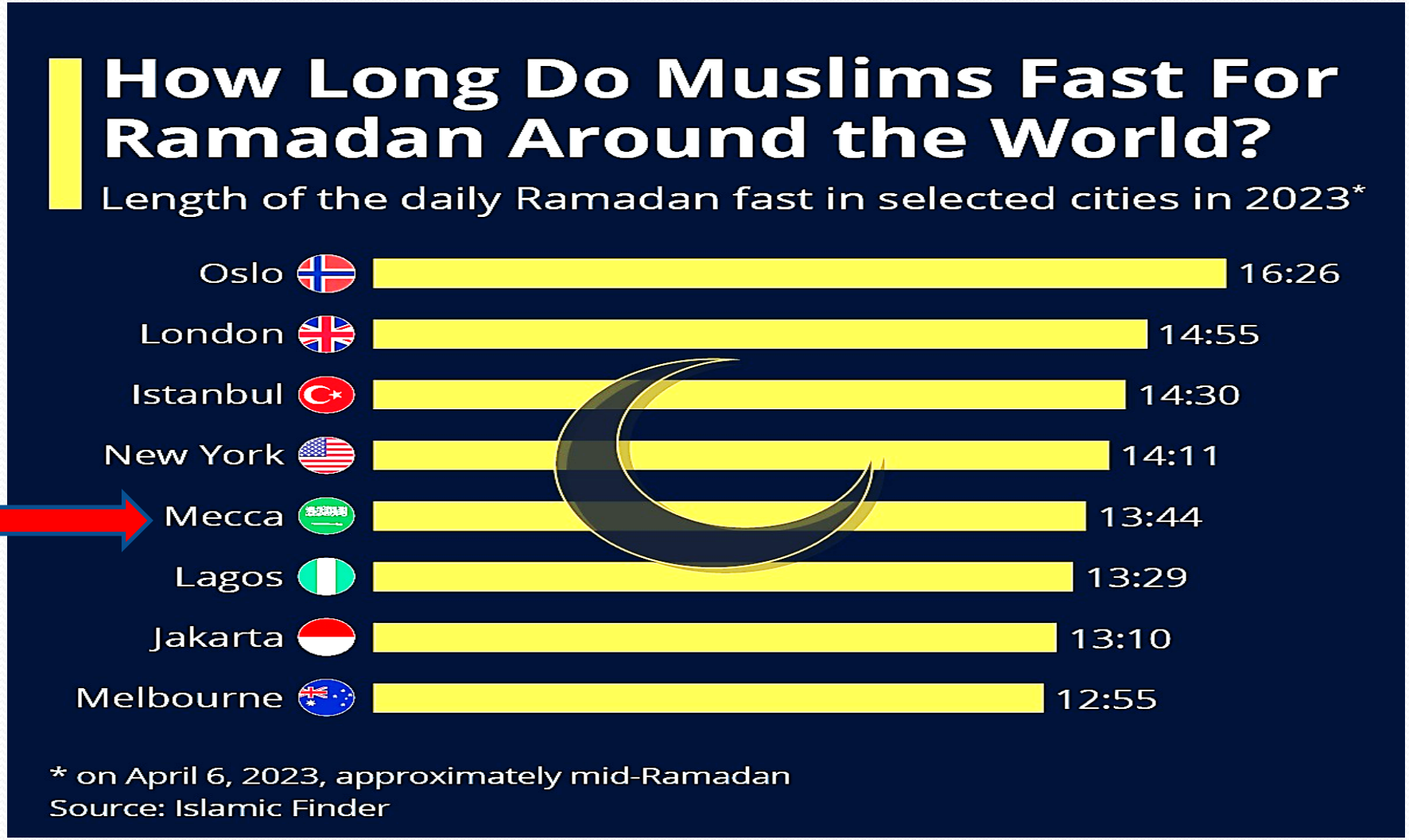
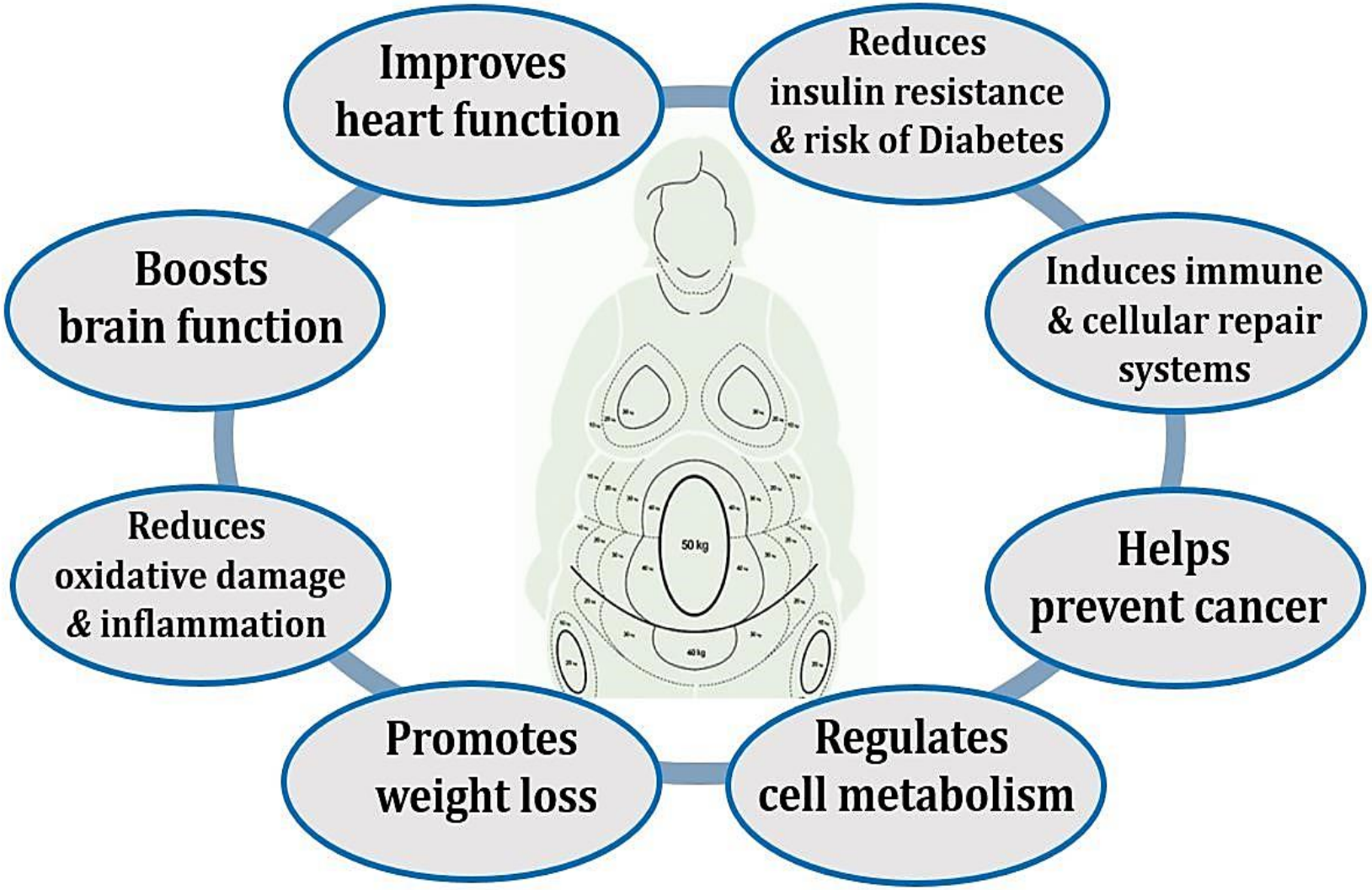
The hours spent fasting vary accordingly from 11-18 hours a day



Effect of fasting on the Body.



Effect of fasting on the Pharmacokinetics of drugs

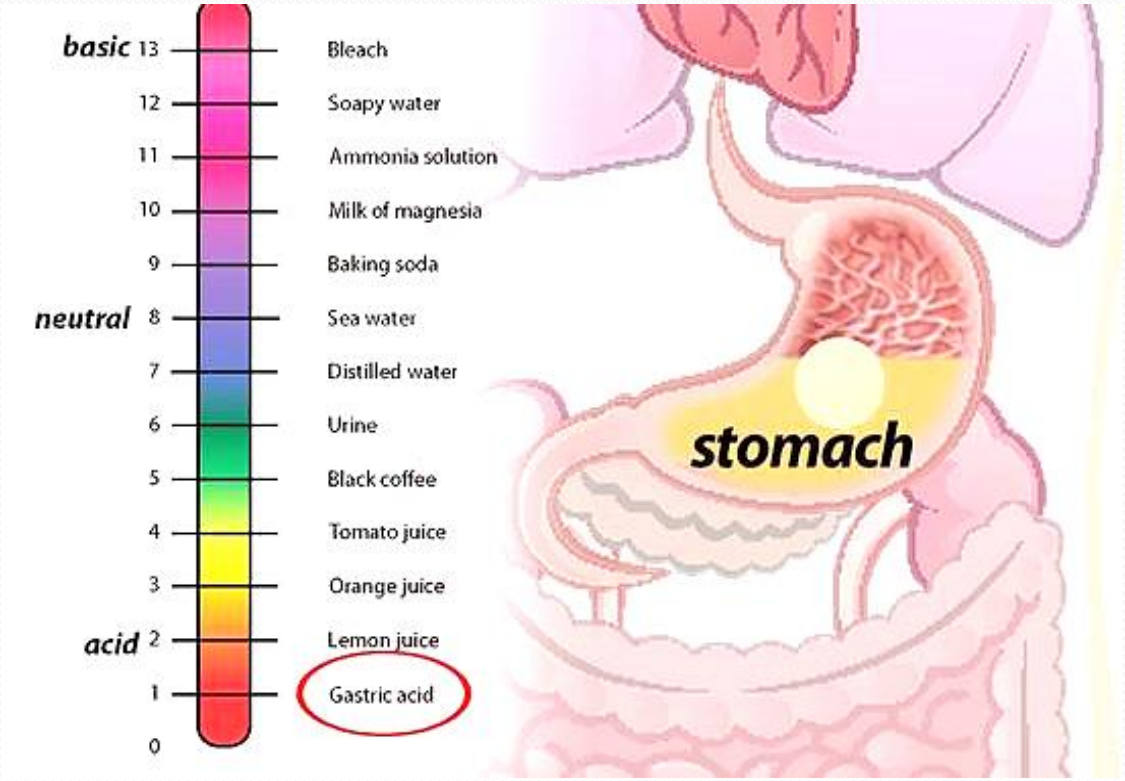
Effect of fasting on the Pharmacokinetics of drugs

- **Fasting can affect the pharmacokinetics of drugs by altering drug absorption and metabolism.**
- **Research has shown that fasting can reduce the absorption rate of certain drugs, such as salicylate and antipyrine, in rats.**
- **A study on healthy subjects demonstrated that short-term fasting can alter systemic cytochrome P450-mediated drug metabolism, affecting systemic clearance but not oral bioavailability.**

Effect of fasting on the Pharmacokinetics of drugs

1) Effect of fasting on Drug absorption.

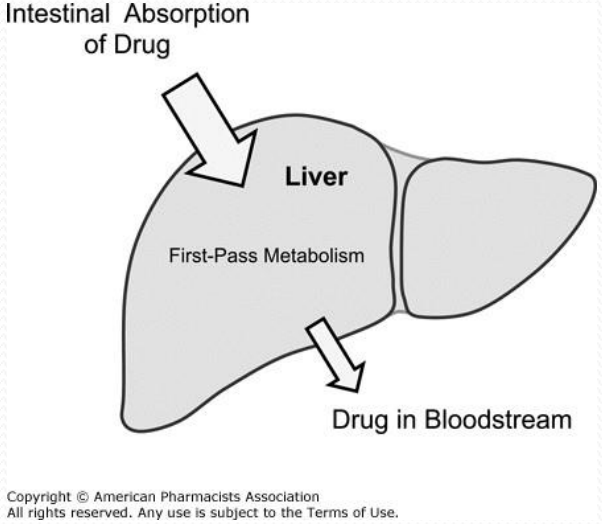
During fasting, the gastric pH significantly decreases up to 1



Effect of fasting on the Pharmacokinetics of drugs

2) Effect of fasting on Drug metabolism.

- Fasting is part of a complex interplay of factors affecting drug response and metabolism.
- Drug metabolism can be altered (increased/decreased)
- Alteration CYP450-mediated drug metabolism (more studies are needed)



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Effect of fasting on the Pharmacokinetics of drugs

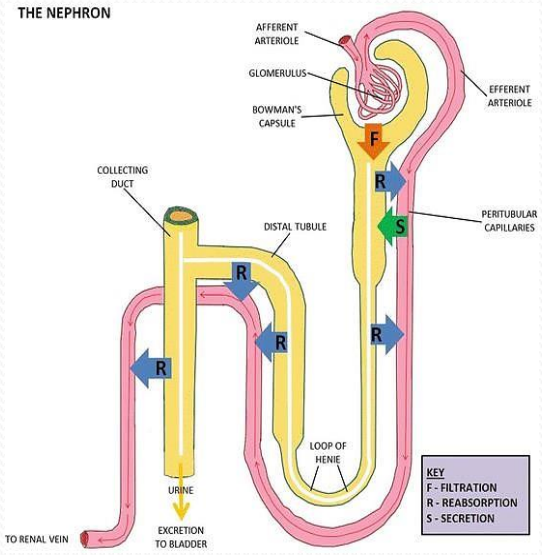
- **Effects of short-term fasting (36 hours) on human drug metabolizing enzymes.**

Human drug metabolizing enzyme	Enzyme activity *% increase (↑) or % decrease (↓) compared to control**
CYP1A2	↑ 17% ($p = 0.04$)
CYP2C9	↓ 19% ($p < 0.01$)
CYP2C19	*No effect*
CYP2D6	↑ 13% ($p < 0.01$)
CYP3A4	↑ 12% ($p < 0.01$)
UGT1A4/2B4/2B7	↓ 13% – 20% ($p < 0.01$)

Effect of fasting on the Pharmacokinetics of drugs

3) Effect of fasting on Drug Excretion.

- Drug execration might be decreased in CKD •
- These patients are more likely to have adverse outcomes



Drug regimens in Ramadan

Drug regimens in Ramadan

- **Drug regimens during the fasting period of Ramadan are changed.**

- **Patients arbitrarily change their drug regimen without seeking medical advice, e.g.**

They:

- **Stop their medications**
- **Modify the timing of administration/intake**
- **Change the frequency**
- **Change the total daily dosage**

Drug regimens in Ramadan

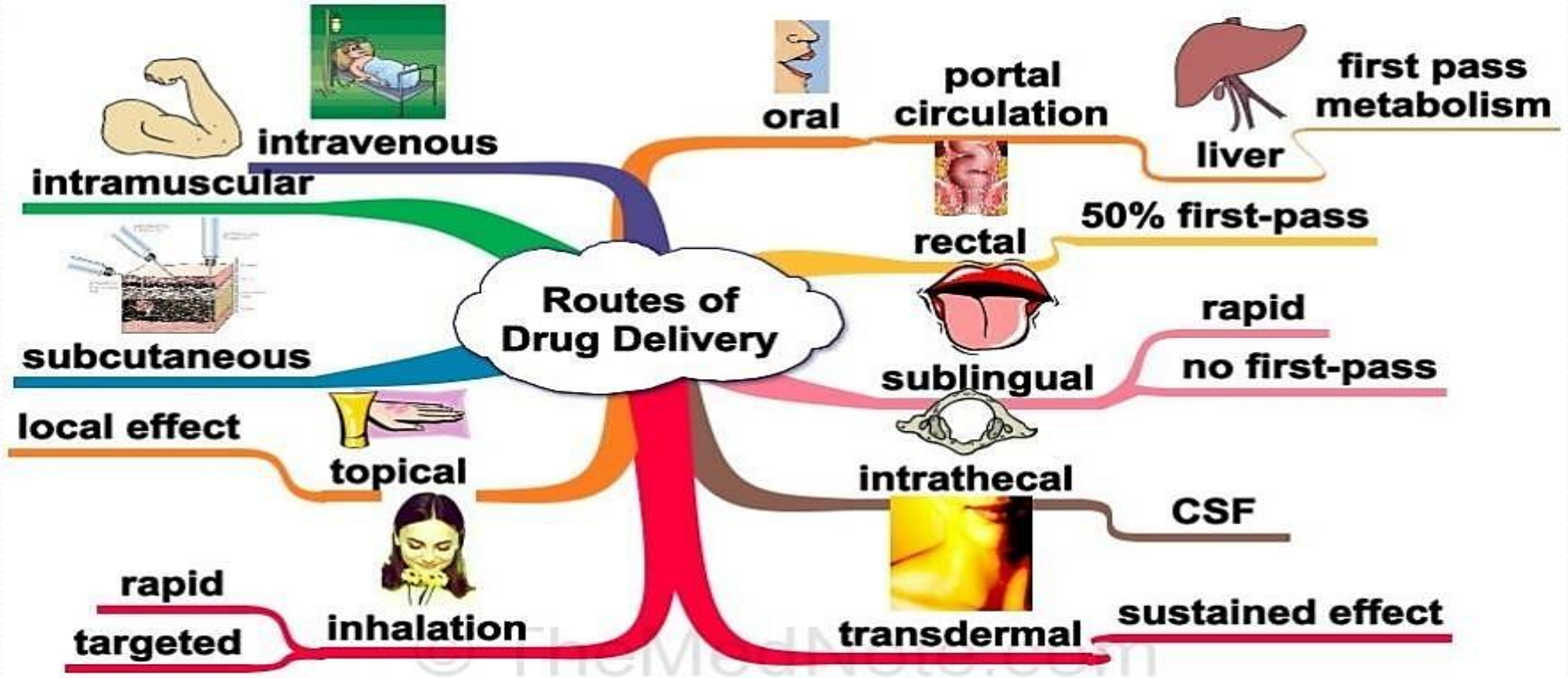
- **Healthcare are responsible to provide information to patients regarding their drugs in Ramadan**

1. Route of administration.

2. The rhythm and schedule of administration information to patients

Route of administration & Fasting

Route of administration & Fasting



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Route of administration & Fasting

- Anything goes through the mouth and reaches the stomach will BREAK the fast.
- Anything considered as food or drinks will BREAK the fast.
- Therefore, any oral medication that reached the stomach will BREAK the fast.

Route of administration & Fasting

- **What about others ???**

➢ **Here, some of opinions:**

1. **Assemblies of Islamic Jurisprudence (Fiqh),1997, Jeddah**
2. **Religious-medical seminar held in Morocco in June 1997**
3. **Some Islamic scholar**

Route of administration & Fasting

1) Assemblies of Islamic Jurisprudence(Fiqh), 1997, Jeddah

- **The following dose NOT Breaking Fasting**
  - **Eye, Ear, and Nose drops, and Nasal Inhalers, provided Nothing is swallowed into the stomach**
  - **Nitroglycerin tablets placed under the tongue for the treatment of angina (provided NOTHING is swallowed into the stomach)**
  - **Insertion into the vagina of pessaries, medical ovules, and vaginal washes.**

Route of administration & Fasting

1) Assemblies of Islamic Jurisprudence(Fiqh), 1997, Jeddah

- **The following dose NOT Breaking Fasting Fellow.**
  - **Injections through the skin, muscle, joints, or veins, with the EXCEPTION of intravenous feeding**
  - **Oxygen and anesthetic gases**
  - **Mouthwash, gargle, or oral spray (provided NOTHING is swallowed into the stomach)**
  - **All Topical substances absorbed into the body through the skin, such as creams, ointments, and medicated plasters**

Route of administration & Fasting

1) Assemblies of Islamic Jurisprudence(Fiqh), 1997, Jeddah

- **They SOTP in the following (needs more research):**
  - **Inhalers**
  - **Anal injections or suppositories**

Route of administration & Fasting

2. Religious-medical seminar held in Morocco in June 1997

- **Their recommendations are as the same as (Assemblies of Islamic Jurisprudence (Fiqh)**

- **Except: (majority of them allowed the following)**
  - **Inhalers**
  - **Anal injections**
  - **Nose drops, nose sprays**
  - **Surgery involving general anesthesia, if the patient decided to fast.**

Route of administration & Fasting

- **There are difference opinion in the following**

1. Nasal sprays, and drops
2. Inhalers
3. Anal injections and suppositories
4. General anesthesia

Route of administration & Fasting

- **Nasal sprays, and drops**
  - **Nasal spry and drops mostly Will Break the Fast (best to avoiding it)**

- **Inhalers:**
  - **Are they reach the stomach or NOT?**
  - **Most likely (NOT reach the stomach)**
  - **So, inhalers most likely they will NOT Break the fast**

Route of administration & Fasting

- **Anal injections or suppositories**
  - **They will NOT break the fast**

- **General anesthesia (like COMA):**
  - **If some hours will NOT break the fast**
  - **If dawn to sunset will BREAK the fast**

Dosing schedule in Ramadan.

Dosing schedule in Ramadan.

- **Drug doses can be taken only between sunset time span between them is shorter and dawn, and the than outside Ramadan**

- **In Yemen (~ 13.5 hours) (Ramadan 1445 H)**

- **In General**

1. **Single daily dose**
2. **Two or more daily dose**

Dosing schedule in Ramadan.

1) Single daily dose.

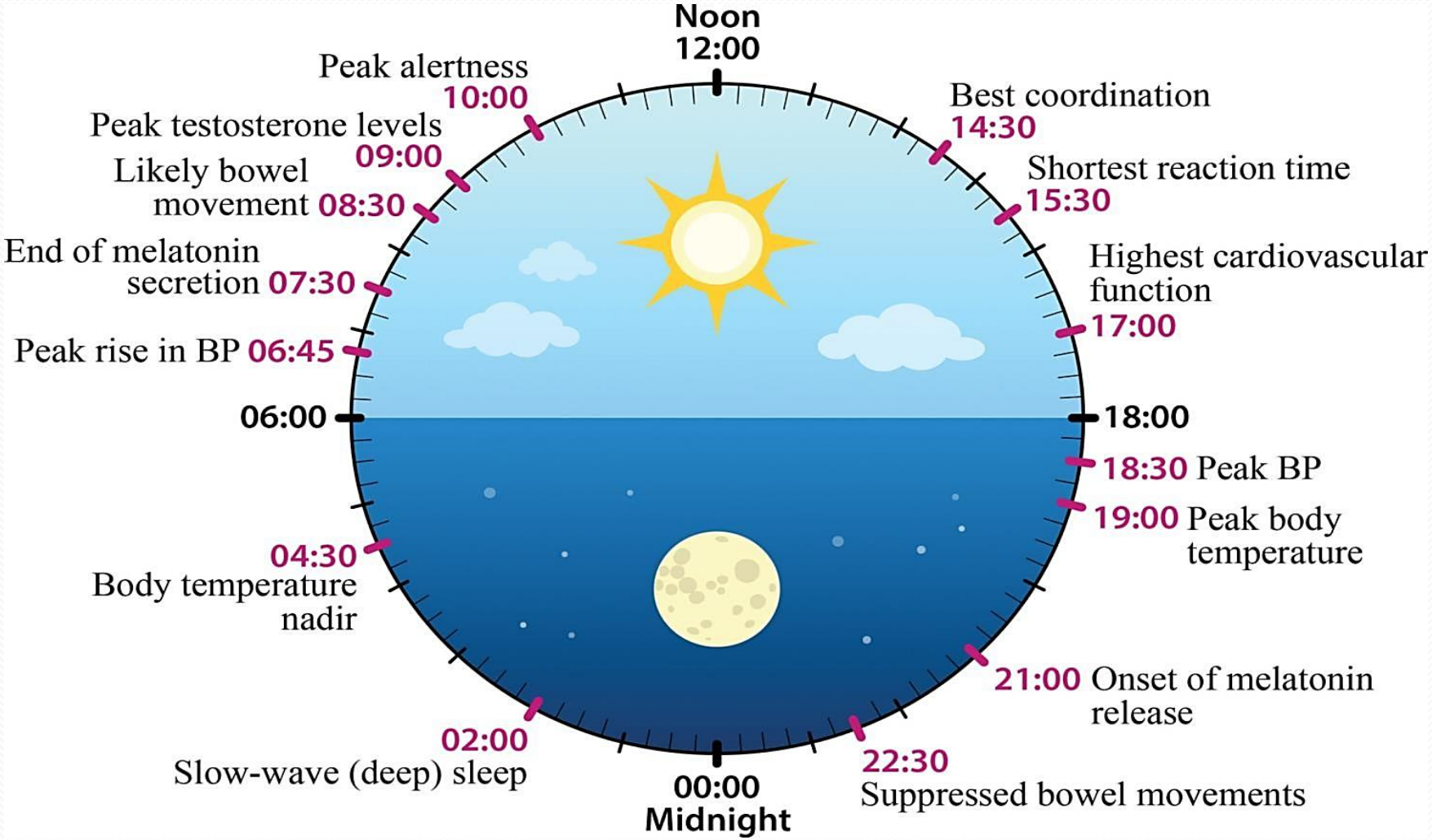
- The easiest situation is that of patients who have a usual

BUT

- When the usual intake is in care evening dose. the morning or during the day the health providers must be careful when delaying the intake to the evening • WHY?!!

- Because • The efficacy and toxicity of many drugs can vary depending on the time of administration in relation to the circadian rhythms of biochemical, physiological, and behavioral processes

Physiological or biochemical functions are at peak



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Dosing schedule in Ramadan.

- **Chronotherapy**
  - **The administration of medication or treatment in coordination with the body's circadian rhythms to maximize effectiveness and minimize side effects.**

Dosing schedule in Ramadan Chronotherapy.

Drugs	Suggested time
Amlodipine	Morning
Diltiazem	Evening
Aspirin	Evening
Lisinopril	Evening
Ramipril	Morning
Nebivolol	Morning/ Evening
Valsartan	Evening
Candesartan	Evening
Diuretics (thiazides, torsemide)	Morning/ Evening
Vildagliptin	Morning/ Evening
Rivaroxaban	Evening
Vitamin D_3	Evening
Calcium	Morning/ Evening

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Dosing schedule in Ramadan Chronotherapy.

- **Limitations of Chronotherapy:**
  1. **Small Studies**
  2. **Conflicting results**
  3. **Did not take into account variations in the sleep-wake routines participants**
  4. **Not conducting in Ramadan.**

Dosing schedule in Ramadan Chronotherapy.

2- Two or more daily doses.

- These alterations could Affect the drug's plasma concentration profile, Therefore, its efficacy and tolerance (esp. narrow therapeutic index drugs).

The Solution ??

- Using slow release formulations •
- Using a drug with a longer elimination half life

Dosing schedule in Ramadan Chronotherapy.

- **Slow Release Formulations**.

Immediate Release	Slow Release
Metoprolol	Metoprolol XR
Valproic acid	Valproic acid CR
Carbamazipine	Carbamzipine (600 mg retard)
Levetiracetam	Levetiracetam (500 mg XR)
Diclofenac (50 mg)	Dicloofenac retard (100mg)
Ketoprofen (100 mg)	Ketoprofen SR (150 mg)

Dosing schedule in Ramadan Chronotherapy.

- **Long Acting Drugs:**

Short Acting	Long Acting
Captopril	Lisinopril
Ibuprofen	Piroxicam
Clarithromycin	Azithromycin
Ciprofloxacin	Levofloxacin / Moxifloxacin
Metronidazole	Tinidazole
	Cefixime

Dosing schedule in Ramadan Chronotherapy.

- **Oral anticoagulants:**

Short acting	Long acting
Dabigatran*	Rivaroxaban
Apixaban*	

*** : Take after full Iftar and Suhoor Interval should be ≥ 8 hours**

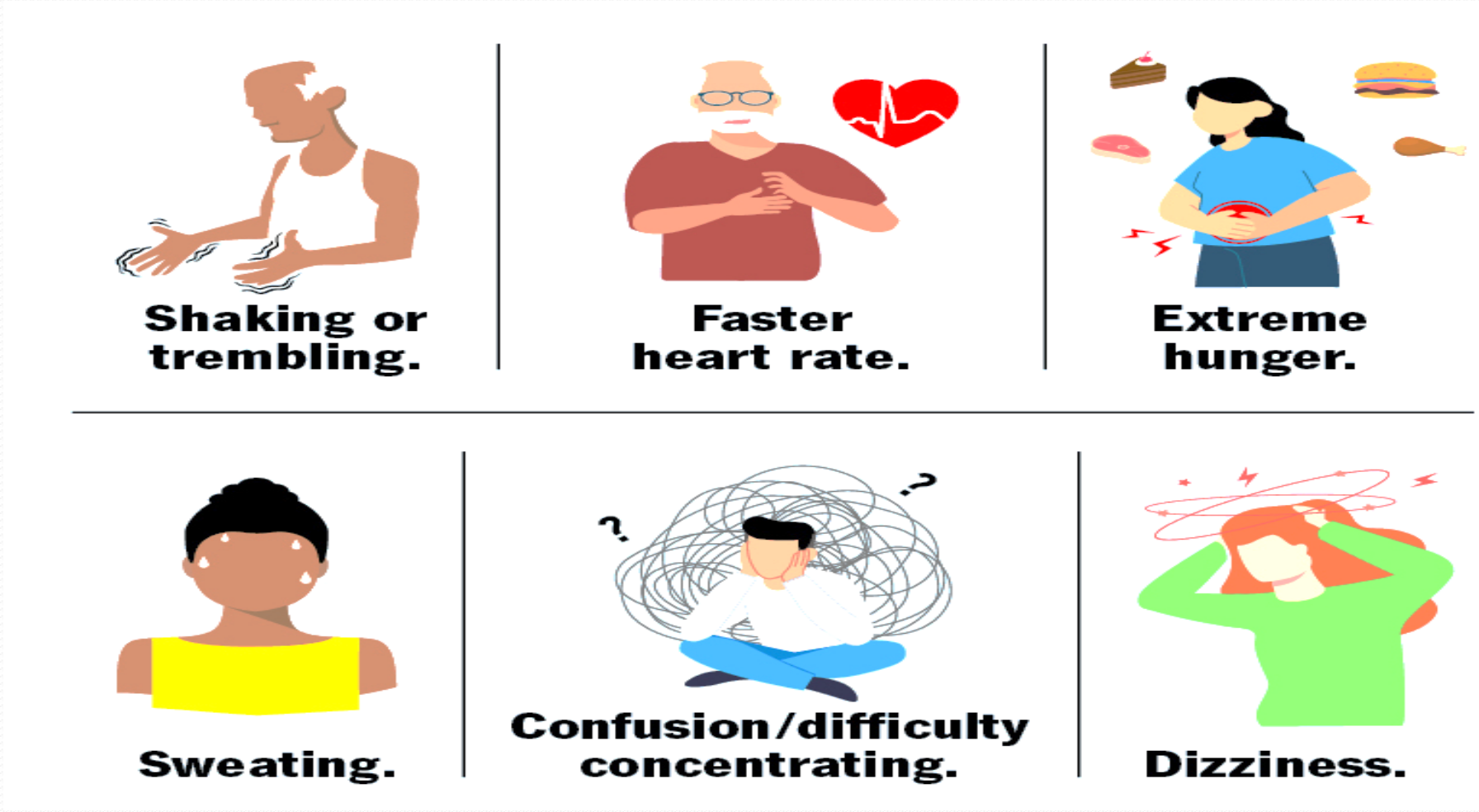
Diabetic medications In Ramadan

Diabetic medications In Ramadan

- **Most people with type 2 diabetes can fast safely with appropriate medical advice and management before and during fasting.**
- **However, people with type 1 diabetes need special attention.**
- **The main concern for diabetes management during Ramadan is hypoglycemia.**

Diabetic medications In Ramadan

- **Hypoglycemia symptoms (Patient awareness) including of:**



Diabetic medications In Ramadan

- **Very high risk (People with any of the following)**

1) **Severe or recurrent episodes of hypoglycemia in the three months before Ramadan**
2) **History of hypoglycemic unawareness**
3) **Poor glycemic control before the month of Ramadan**
4) **Acute illness**
5) **Poorly controlled type 1 diabetes**
6) **Comorbidities such as chronic kidney disease**

Diabetic medications In Ramadan

- **IDF-DAR 2021 risk factors and scores for risk stratification.**

Risk Factors	Score
Diabetes type and duration	
Type 1 diabetes	1
Type 2 diabetes	0
Duration of diabetes	
Duration ≥ 10 years	1
Duration < 10 years	0
History of hypoglycemia and hypoglycemia unawareness	
Hypoglycemia unawareness	6.5
Recent severe hypoglycemia	5.5
Recurrent hypoglycemia	3.5
Hypoglycemia < once a week	1
No hypoglycemia	0

Diabetic medications In Ramadan

- **IDF-DAR 2021 risk factors and scores for risk stratification.**

Risk Factors	Score
Glycemic control	
A1c > 9%	2
A1c 7.5–9%	1
A1c < 7.5%	0
Type of Treatment	
Multiple daily premixed insulin regimen	3
Basal bolus regimen/Insulin pump	2.5
Once daily premixed insulin	2
Basal insulin only	1.5
Older generation sulfonylureas	1
Second generation sulfonylureas	0.5
Non-insulin and non-SU agents	0

Diabetic medications In Ramadan

- **IDF-DAR 2021 risk factors and scores for risk stratification.**

Risk Factors	Score
Self-monitoring of blood glucose(SMBG)	
No adequate SMBG checks	2
Suboptimal SMBG checks	1
Adequate SMBG checks	0
Occurrence of Diabetic ketoacidosis/ Hyperglycemic hyperosmolar state	
In last 3 months	3
In the last 6 month	2
In the last 12 month	1
None	0
Cardiovascular complications/co morbidities	
Unstable	6.5
Stable	2
None	0

Diabetic medications In Ramadan

- **IDF-DAR 2021 risk factors and scores for risk stratification.**

Risk Factors	Score
Renal complications/co-morbidities	
GFR < 30 mL/min/Stage 4 CKD	6.5
GFR 30–44 mL/min/Stage 3b CKD	4
GFR 45–59 mL/min/Stage 3a CKD	2
GFR ≥ 60 mL/min	0
Pregnancy	
Blood glucose not within target range	6.5
Blood glucose within target range	3.5
Not pregnant	0
Frailty and cognitive function	
Impaired cognition or Frail	6.5
>70 year without home support	3.5
None	0

Diabetic medications In Ramadan

- **IDF-DAR 2021 risk factors and scores for risk stratification.**

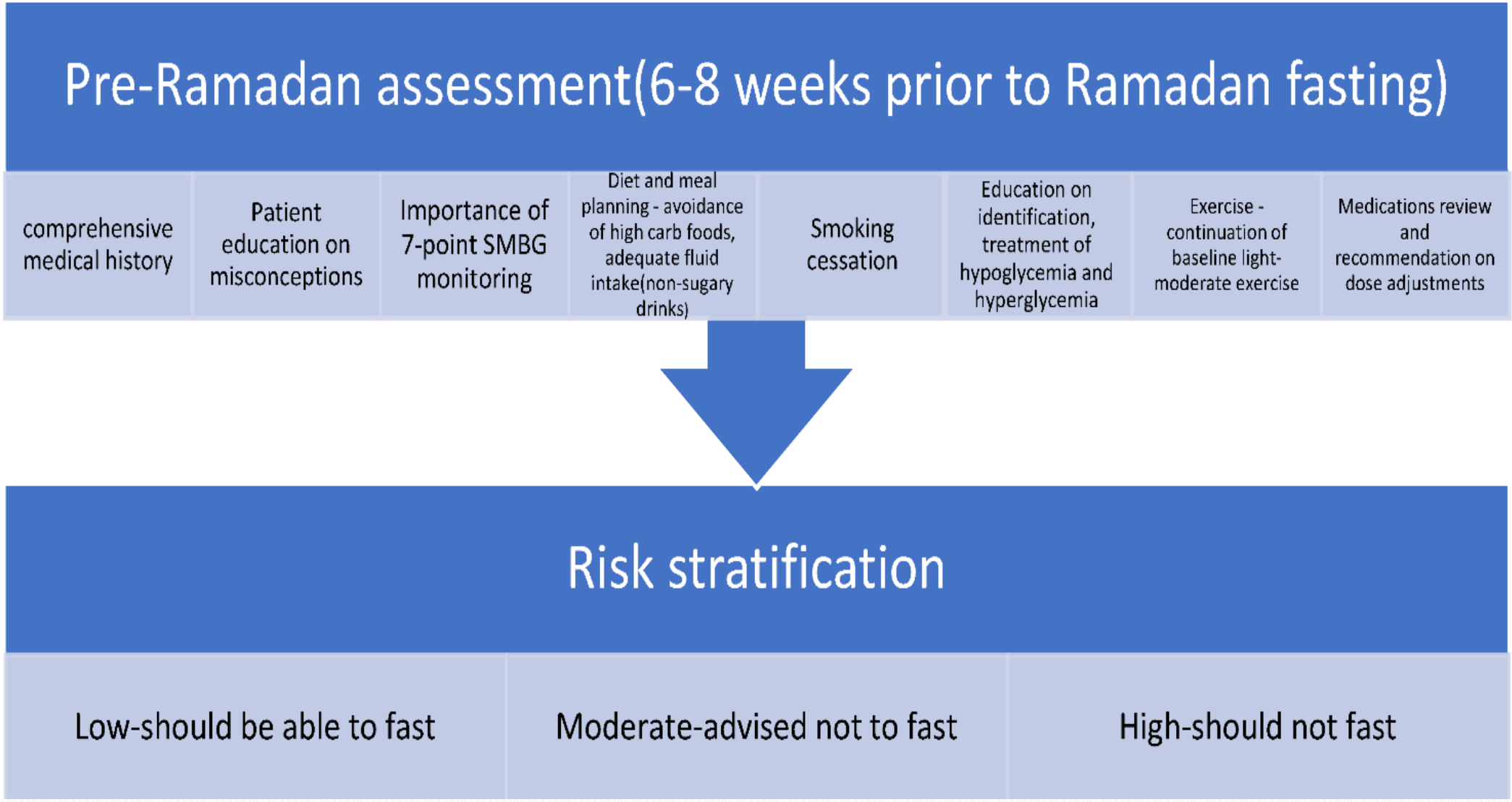
Risk Factors	Score
Physical labor	
High intense	4
Moderate intense	2
None	0
Prior Ramadan experience	
Negative experience	1
No particular experience	0
Fasting hours based on location	
≥16 h	1
<16 h	0

Diabetic medications In Ramadan

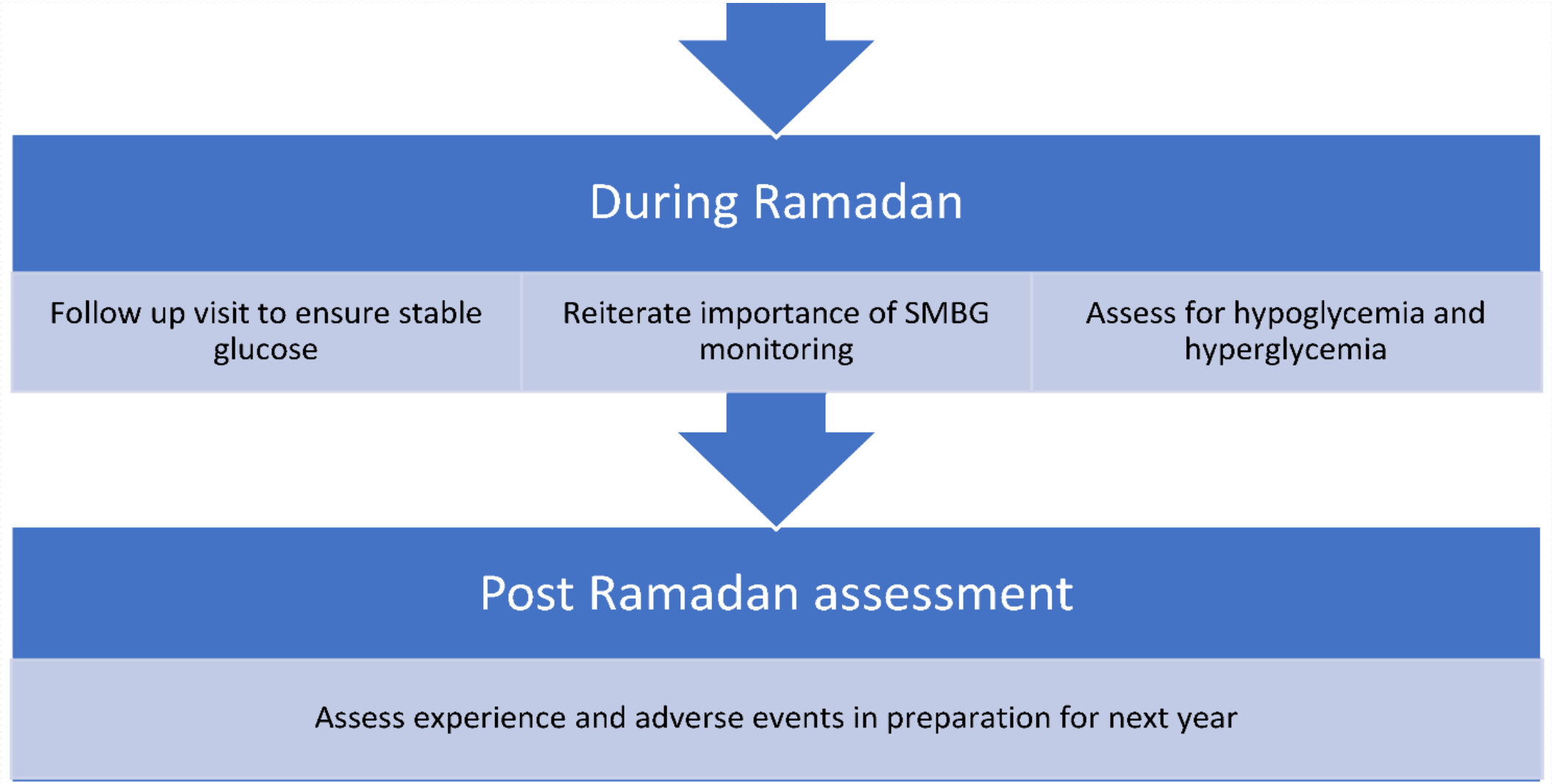
- **IDF-DAR 2021 risk factors and scores for risk stratification.**
  - **Interpretation**

Score 0–3 (Low risk)	Should be able to fast
Score 3.5–6 (Moderate risk)	Advised not to fast
Score > 6 (High risk)	Should not fast

Diabetic medications In Ramadan


Pre-Ramadan assessment(6-8 weeks prior to Ramadan fasting)
comprehensive medical history
Patient education on misconceptions
Importance of 7-point SMBG monitoring
Diet and meal planning - avoidance of high carb foods, adequate fluid intake(non-sugary drinks)
Smoking cessation
Education on identification, treatment of hypoglycemia and hyperglycemia
Exercise - continuation of baseline light-moderate exercise
Medications review and recommendation on dose adjustments
Risk stratification
Low-should be able to fast
Moderate-advised not to fast
High-should not fast

Diabetic medications In Ramadan


During Ramadan
Follow up visit to ensure stable glucose
Reiterate importance of SMBG monitoring
Assess for hypoglycemia and hyperglycemia
Post Ramadan assessment
Assess experience and adverse events in preparation for next year

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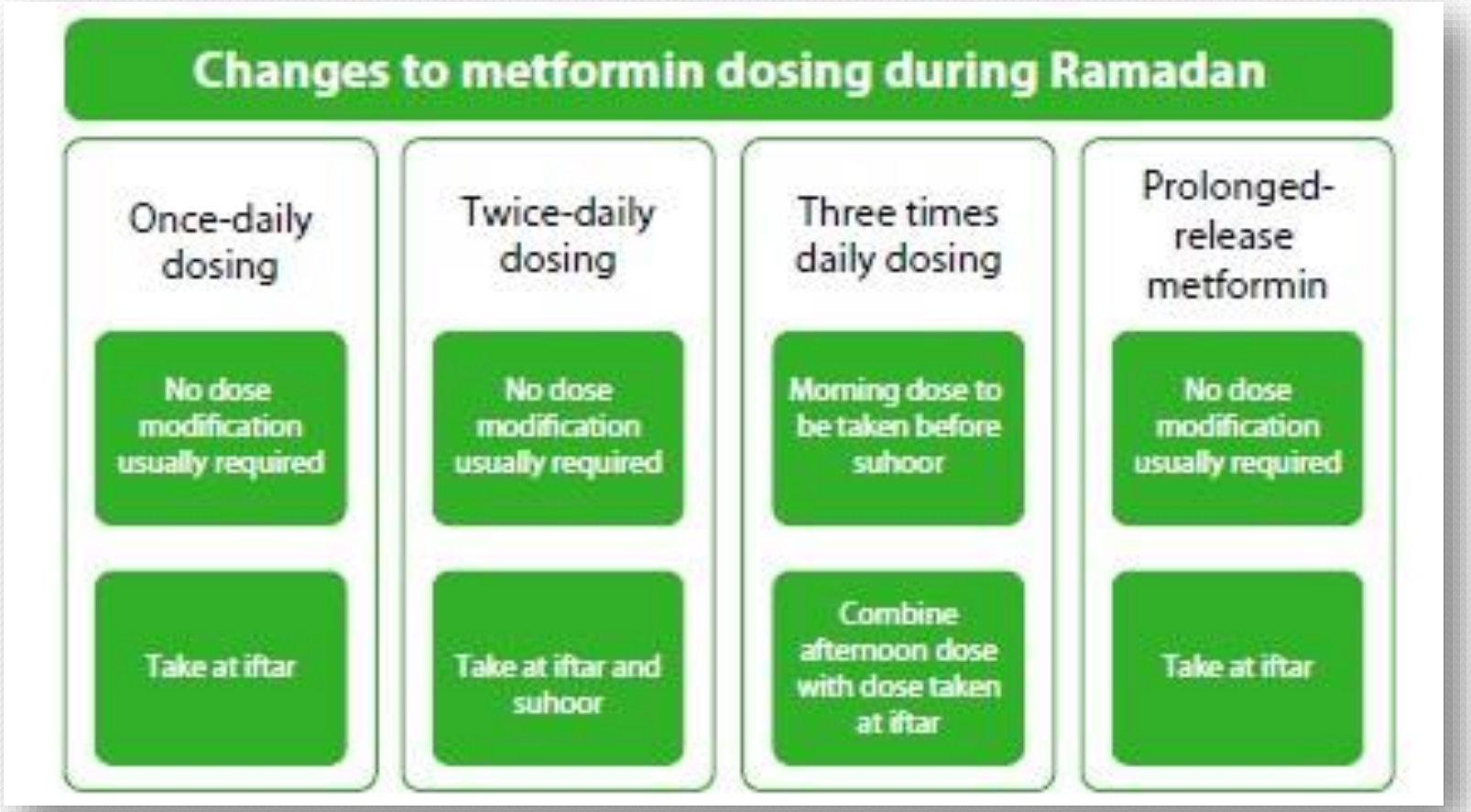
Diabetic medications In Ramadan

1) Metformin


Changes to metformin dosing during Ramadan
Once-daily dosing
No dose modification usually required
Take at iftar
Twice-daily dosing
No dose modification usually required
Take at iftar and suhoor
Three times daily dosing
Morning dose to be taken before suhoor
Combine afternoon dose with dose taken at iftar
Prolonged-release metformin
No dose modification usually required
Take at iftar

Diabetic medications In Ramadan

2) Thiazolidinediones.

- Due to the low risk of hypoglycemia with PIOGLITAZONE, NO DOSE MODIFICATION is required during Ramadan and doses can be taken with iftar or suhoor

3) Short-acting insulin secretagogues (e.g. repaglinide).

- The daily dose of SHORT-ACTING INSULIN SECRETAGOGUES (based on a three-meal dosing) may be REDUCED or REDISTRIBUTED to two doses during Ramadan according to meal size

Diabetic medications In Ramadan

4) Sulphonylureas (SU).

Changes to SU dosing during Ramadan

Once-daily dosing	Twice-daily dosing	Older drugs in the class
• Take at iftar • In Pt with well controlled BG levels, the dose may be reduced	• Iftar dose remains the same • In Pt with well controlled BG levels, the suhoor dose should be reduced	• Older Drugs (e.g. Glibenclamide) Carry a higher risk of hypoglycemia and should be avoided • 2nd Generation SUs (gliclazide, glimepiride) should be used in preference

Diabetic medications In Ramadan

5) Sodium-glucose co-transporter-2 (SGLT2) inhibitors (e.g. dapagliflozin).

- SGLT2 Inhibitors can be used with caution in some patients. During Ramadan no dose adjustment IS required and it is advised that the dose be taken with iftar

6) Dipeptidyl peptidase-4 (DPP-4) inhibitors (e.g. sitagliptin).

- DPP-4 Inhibitors do not require treatment modifications during Ramadan.

Diabetic medications In Ramadan

7) Glucagon-like peptide-1 receptor agonists (GLP-1 RAs) (e.g. Exenatide).

- As long as GLP-1 RAs have been appropriately DOSE-TITRATED prior to Ramadan (6 weeks before), no further treatment modifications are required.

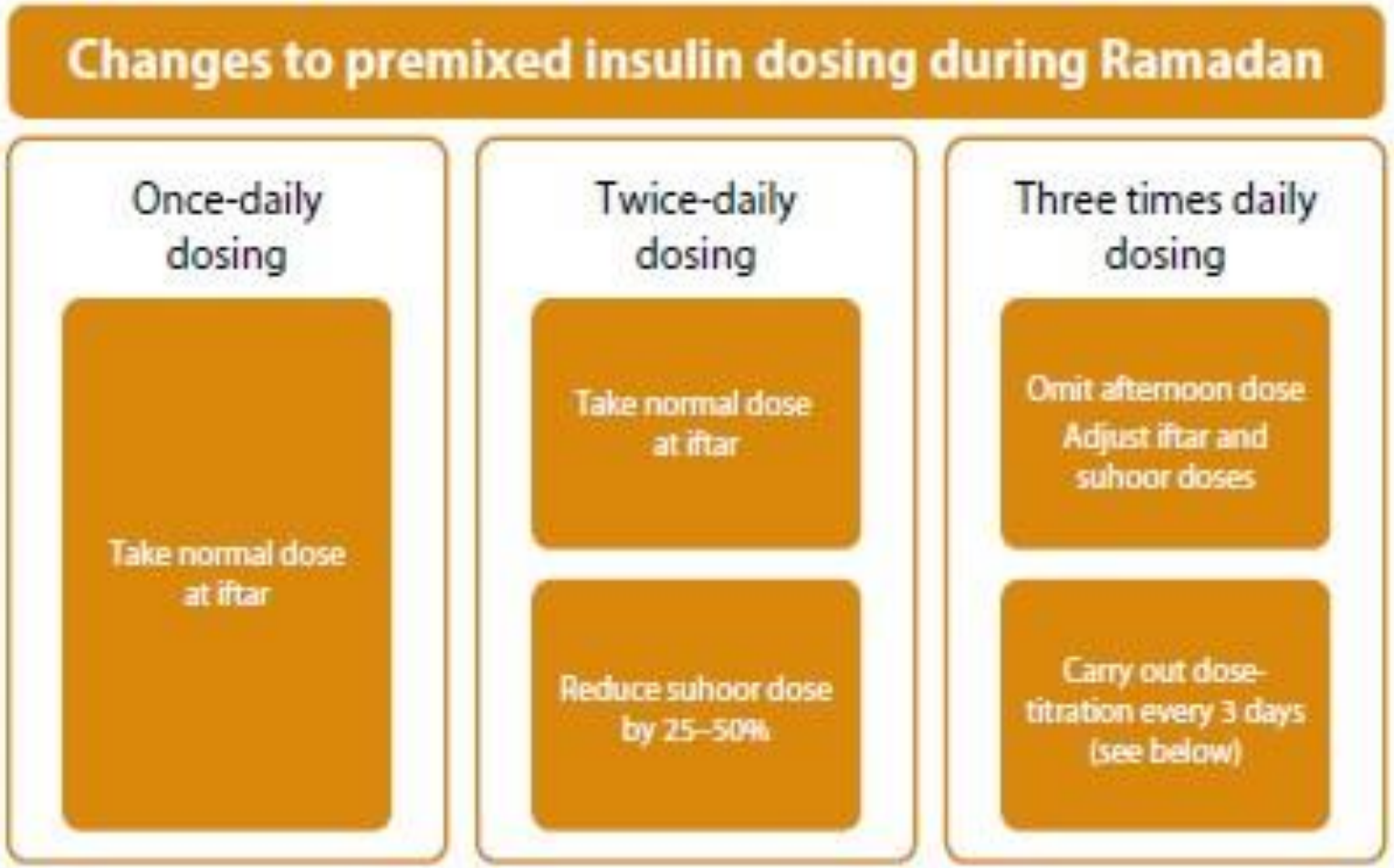
Diabetic medications In Ramadan

8) Insulin.

Type of Insulin	Dosing Frequency	Recommended Change
Basal insulin (insulin glargine/NPH/Degludec/Detemir)	Once daily	Reduce dose by 15–30% and Take at Iftar (sunset meal)
Basal insulin (insulin glargine/NPH/Degludec/Detemir)	Twice daily	Take usual morning dose at Iftar (sunset meal), Reduce evening dose by 50% and Take at Suhoor (pre-dawn meal)
Short-acting insulin/Bolus insulin		Take normal dose at Iftar (sunset meal), Skip lunch time dose and Reduce Suhoor (pre-dawn meal) dose by 25–50%

Diabetic medications In Ramadan

8) Insulin.


Changes to premixed insulin dosing during Ramadan
Once-daily dosing
Take normal dose at iftar
Twice-daily dosing
Take normal dose at iftar
Reduce suhoor dose by 25–50%
Three times daily dosing
Omit afternoon dose
Adjust iftar and suhoor doses
Carry out dose-titration every 3 days (see below)

Diabetic medications In Ramadan

Checking RBS.

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Diabetic medications In Ramadan

Adjusting bolus insulin doses during Ramadan.

Pre-Sunset, Pre-Dawn Blood Glucose	Rapid- or Short-Acting Insulin Dose Adjustment
>250 mg/dL	Increase dose by 20%
>180 mg/dL	Increase dose by 10%
100–180 mg/dL	No change
<100 mg/dL or symptoms of hypoglycemia	Reduce dose by 10%
<70 mg/dL	Reduce dose by 20% and preferably avoid fast

Summary

- Patients with chronic diseases.

- **Patients who:**
  1) **Have chronic illnesses**
  2) **Take medications on a regular basis**

- **Before Ramadan start Assessment.**

Summary

- Patients with chronic diseases.

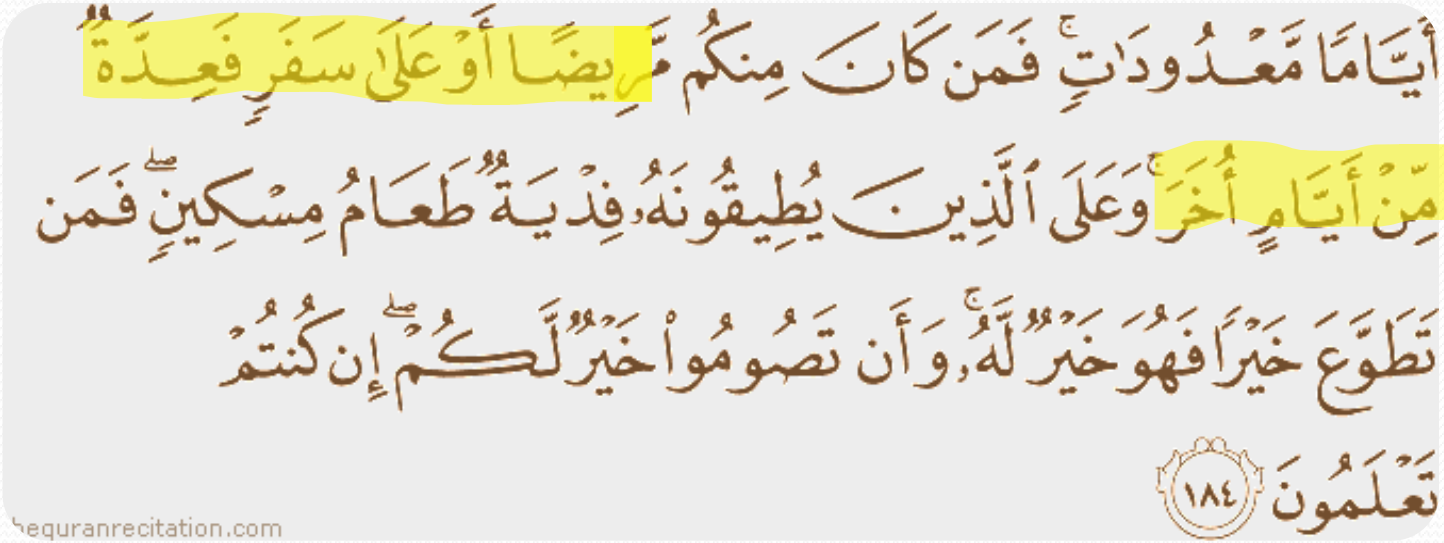
- They need to see their healthcare provider (Why??)

1. To ensure their ability to fast
2. To adjust their medications dosages if necessary
3. To change frequency of medications to accommodate fasting schedule
4. For close monitoring of their health condition throughout the month Ramadan

Summary

- **Patients with chronic diseases.**

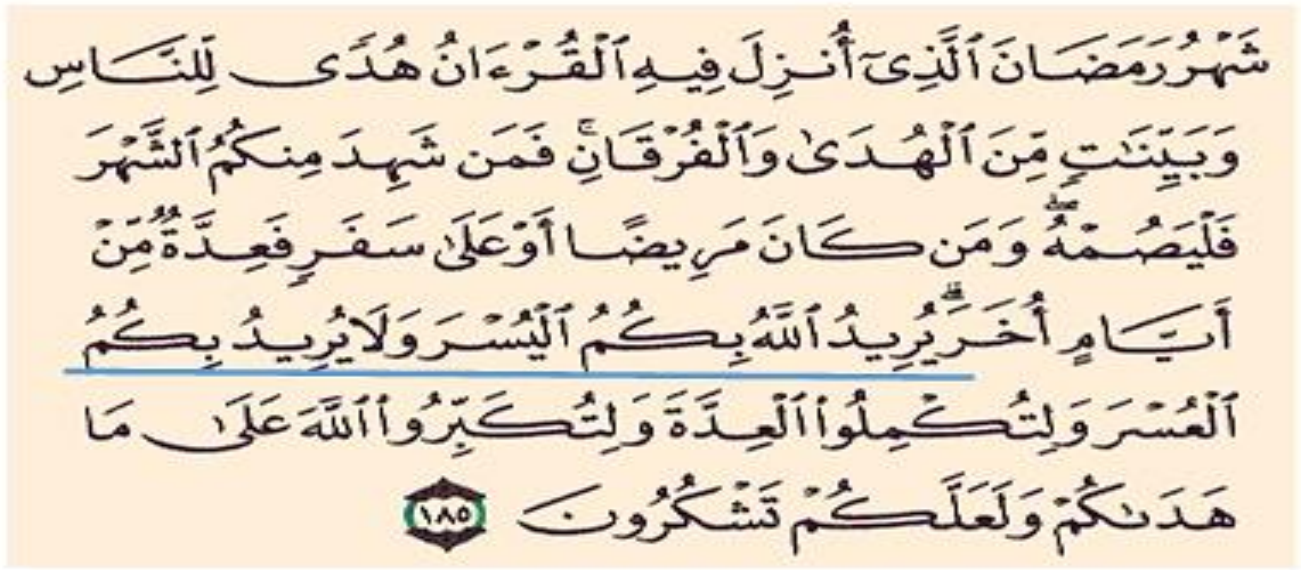
- **In case of the fasting will harm patient health, patient can breaking the fast.**



Summary

- **Patients with chronic diseases.**

- **Islam is Easy .**


شَهْرُ رَمَضَانَ ٱلَّذِىٓ أُنزِلَ فِيهِ ٱلْقُرْءَانُ هُدًى لِّلنَّاسِ
وَبَيِّنَٰتٍ مِّنَ ٱلْهُدَىٰ وَٱلْفُرْقَانِ ۚ فَمَن شَهِدَ مِنكُمُ ٱلشَّهْرَ
فَلْيَصُمْهُ ۖ وَمَن كَانَ مَرِيضًا أَوْ عَلَىٰ سَفَرٍ فَعِدَّةٌ مِّنْ
أَيَّامٍ أُخَرَ ۗ يُرِيدُ ٱللَّهُ بِكُمُ ٱلْيُسْرَ وَلَا يُرِيدُ بِكُمُ
ٱلْعُسْرَ وَلِتُكْمِلُوا۟ ٱلْعِدَّةَ وَلِتُكَبِّرُوا۟ ٱللَّهَ عَلَىٰ مَا
هَدَىٰكُمْ وَلَعَلَّكُمْ تَشْكُرُونَ ﴿١٨٥﴾

Antibiotics in Ramadan

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Antibiotics and Ramadan.

Pharmacodynamics of Antibiotics:

1) Time – dependent

- **Duration of serum drug conc above the MIC.**
- **Beta-lactams, macrolides, lincosamides & vancomycin.**

Antibiotics and Ramadan.

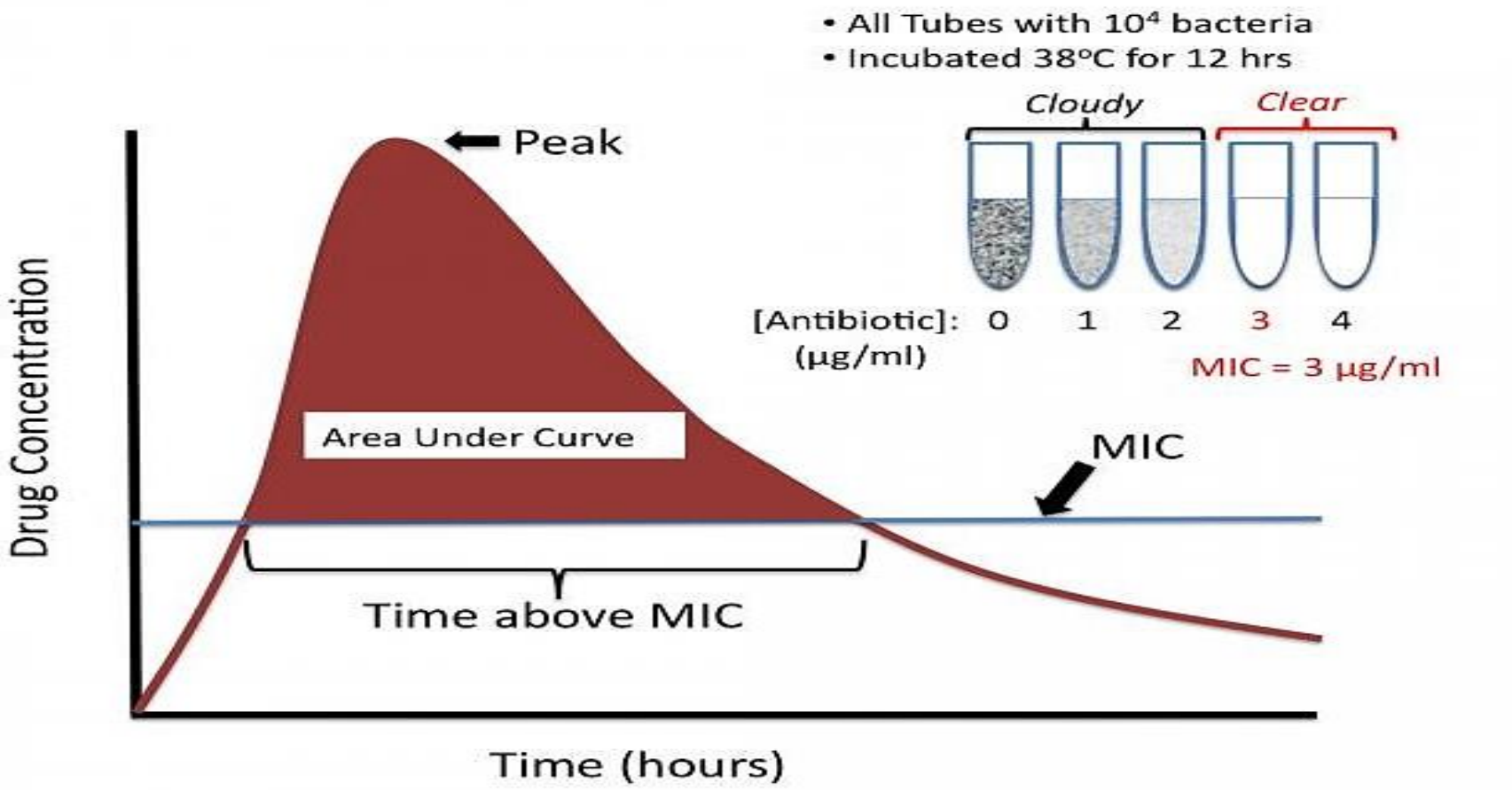
Pharmacodynamics of Antibiotics:

2) Concentration - dependent:

- Ratio of peak serum drug conc/MIC.
- Aminoglycosides and fluoroquinolones.

Antibiotics and Ramadan.

Pharmacodynamics of Antibiotics:



Antibiotics and Ramadan

Common Bacterial Infections & Single-daily-dose Antibiotics:

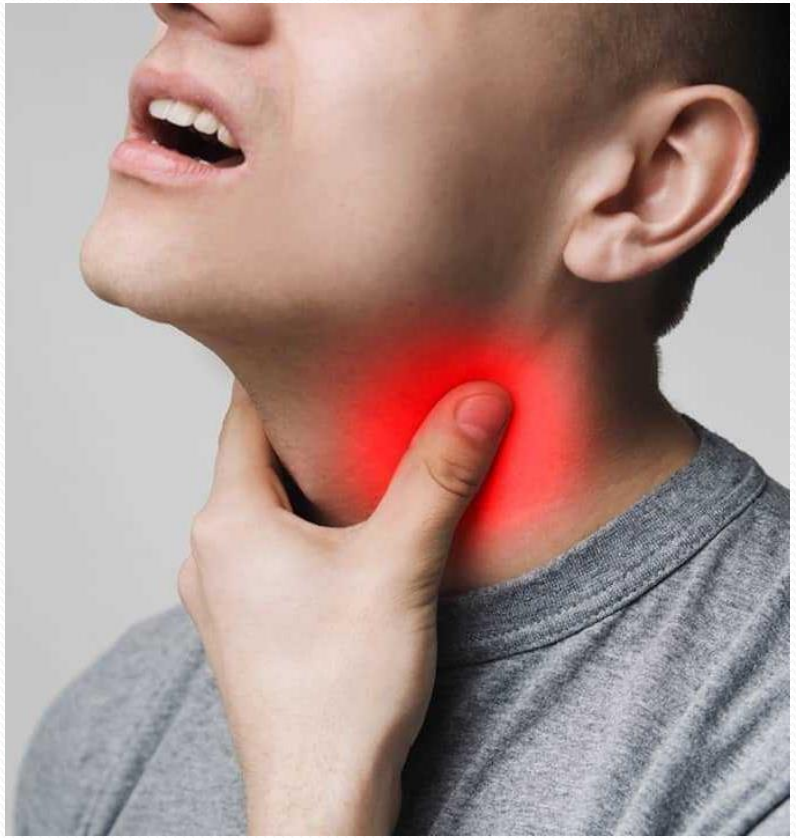
1) Pharyngitis/tonsillitis (sore throat).
2) Lower Respiratory Tract Infection.
3) Acute Sinusitis.
4) Skin infections.
5) Uncomplicated cystitis (women).
6) Traveler's diarrhea.
7) Infectious Diarrhea

By/ Rezg AL-Sunah

Antibiotics and Ramadan

1) Pharyngitis/tonsillitis (sore throat).

- **Cefadroxil** 1000 mg every 24 hours for 10 days.
- **Azithromycin** 500 mg every 24 hours for 3 days.
- **Roxithromycin** 300 mg every 24 hours for 5-10 days.



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Antibiotics and Ramadan

2) Lower Respiratory Tract Infection.

- **B-lactamase-producing strains of Hemophilus influenzae and Moraxella catarrhalis**

❖ **Amoxicillin/clavulanate (a beta-lactam)**

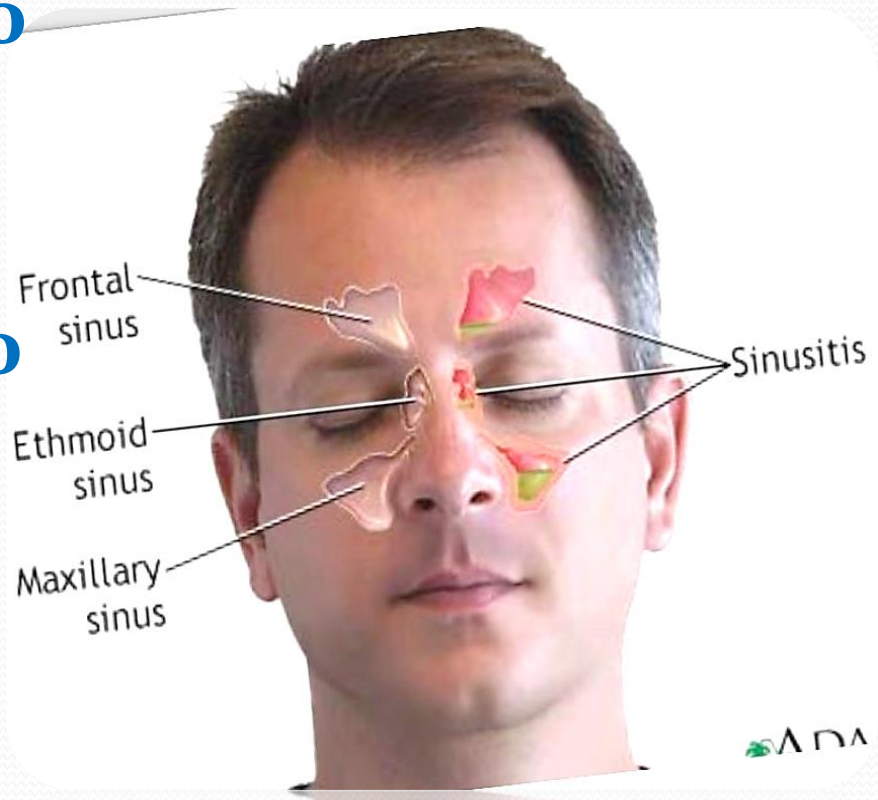
➢ **Mild to moderate: 500/125 mg PO q12hr or 250/125 mg PO q8hr for 10 days**

➢ **Severe: 875/125 mg PO q12hr or 500/125 mg PO q8hr or 2000 mg (2 extended-release tabs) PO q12hr for 7-10 days**

Antibiotics and Ramadan

3) Acute Sinusitis.

- **Cefdinir** 600 mg every 24 hours for 10 days.
- **Doxycycline** 200 mg initially, then 100 mg every 24 hours for 5 days **in total.**
- **Levofloxacin** 500 mg every 24 hours for 10-14 days.



Antibiotics and Ramadan

4) Skin infections.

- **Cefadroxil** 1000 mg every 24 hours.
- **Doxycycline** 200 mg initially, then 100-200 mg every 24 hours.
- **Levofloxacin** 500-750 mg every 24 hours.

Antibiotics and Ramadan

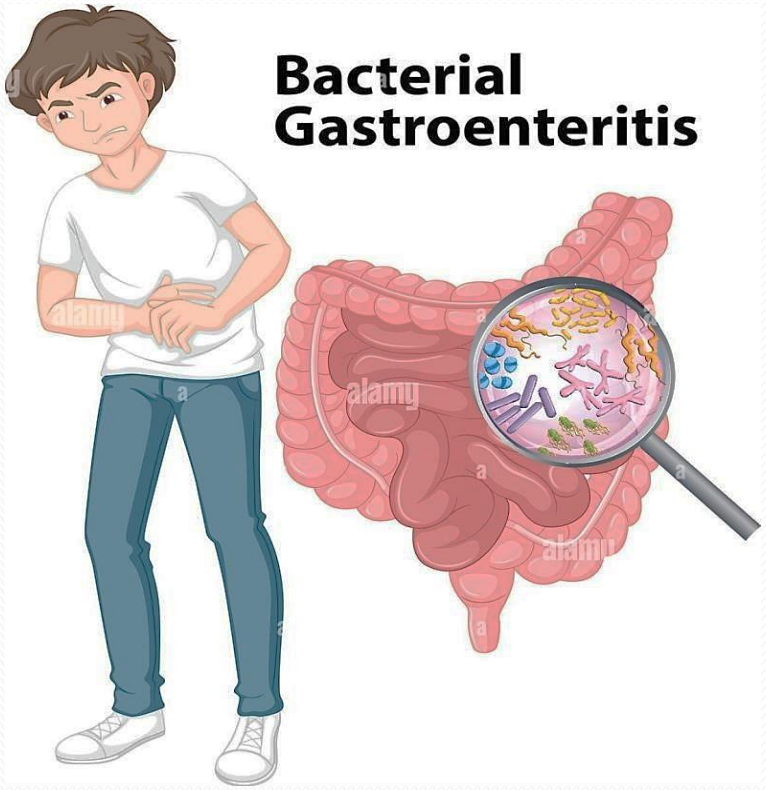
5) Uncomplicated cystitis (women).

- **Fosfomycin** 3000 mg (single daily dose).
- **Cefadroxil** 1000-2000 mg every 24 hours, for 5-7 days.
- **Levofloxacin** 250 mg every 24 hours, for 3 days.

Antibiotics and Ramadan

6) Traveler's diarrhea.

- **Azithromycin** 500 mg every 24 hours, for 3 days.
- **Cefixime** 400 mg every 24 hours, for 6 days.
- **Levofloxacin** 500 mg every 24 hours, for 3 days.



Antibiotics and Ramadan

7) Infectious Diarrhea

Mild/moderate/severe:

- **Ciprofloxacin** 500 mg PO q12hr for 5-7

Thank you

By/ Rezg AL-Sunah